Many of us are aware of a medical imaging procedure known as CT scanning (which stands for computed tomography). This procedure has been suggested in the occupational health setting as a possible tool to screen for mesothelioma and lung cancer in the hope of early diagnosis and possibly improved outcomes.

More frequently, patients get sent for these procedures as part of the diagnosis of medical conditions—which is different than screening. CT scans (e.g., scans of the brain, abdomen, lung, or heart) are ordered because they provide more detail than x-rays. In addition to the (possible) benefits that patients have experienced from such medical imaging, attention has recently been paid to the increasing frequency of physicians’ ordering these scans and the burden of ionizing radiation associated with repeated tests. This article is meant to raise awareness about the risks from these medical procedures, regardless of whether scans are ordered in a workplace screening setting or by a personal physician for diagnosis.

**How does the radiation exposure from a CT scan compare to a chest x-ray?**

A diagnostic CT chest scan procedure delivers about 70 times the radiation dose received from a regular chest x-ray, which delivers about 0.1 mSv or approximately 7 mSv.

**What is the extent of exposures and what are the possible risks that might be associated with repeated procedures?**

Often these CT procedures may be repeated periodically. Recently published articles have addressed this. In 2010, a study in the *Journal of the American Medical Association* looked at heart patients undergoing myocardial perfusion imaging (MPI), a very common CT procedure (9.3 million procedures were performed in the U.S. in 2002). They showed that about one-third of the patients received cumulative doses from all medical sources of more than 100 mSv; to put this in perspective, this is double the occupational radiation dose of 50 mSv allowed in a year. The authors concluded that repeated testing was common and in many patients was associated with high total doses of radiation.

An editorial written about this study estimated that the use of CT may be associated with 1.5% to 2% of all cancers in the U.S. in the future, and there is evidence that too many imaging exams are being performed. The estimated risk of cancer due to exposure from a typical abdominal CT scan is approximately 1 in 300 to 1 in 2,000—depending on dose, age, sex, and body
that physicians generally underestimate the amount of radiation doses and their associated effects, and underestimate the risk to patients who have had the imaging procedures. Physicians—and their patients—need to weigh the potential benefits against the potential harm when ordering or recommending a procedure that involves ionizing radiation. It is important to keep in mind that a substantial number of patients may undergo multiple procedures in a short period of time. Multiple procedures in an individual can result in total exposure that approaches or exceeds the range where there is evidence of an increased risk of cancer (cumulative doses above 50 mSv).

It is important that workers—and their physicians—be made aware of these issues. When considering undergoing a CT scan, whether for workplace screening related to workplace exposure or for diagnosis, workers should discuss the possible benefits and risks of the procedure with their physician.

What initiatives are underway in this regard?
The Canadian Association of Radiologists and other international organizations are undertaking efforts to produce guidelines to help medical practitioners decide whether a CT scan would be the most appropriate tool, and have proposed patient dose tracking initiatives—a system for tracking a patient’s medical exposure history and related radiation doses.

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